EXHIBIT 3

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF TEXAS

HOUSTON DIVISION

In re ANADARKO PETROLEUM CORPORATION SECURITIES LITIGATION	§	Civil Action No. 4:20-cv-00576
	§	
	§	CLASS ACTION
	§	
	§	The Honorable Charles R. Eskridge III

REPORT OF BJORN I. STEINHOLT, CFA IN SUPPORT OF PLAINTIFFS' MOTION TO EXCLUDE CERTAIN TESTIMONY BY DEFENDANTS' PROPOSED EXPERT DR. ALLEN FERRELL

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I. BACKGROUND

1. I have been asked by Plaintiffs' counsel, to review Dr. Ferrell's event study methodology, statistical results and reasoning when analyzing the May 3, 2017, price returns for Anadarko Petroleum Corporation ("Anadarko"), Cobalt International ("Cobalt") and ConocoPhillips.[1]

2. Statistical tests, such as Dr. Ferrell's event studies, suffer from both Type I and Type II errors. Type I errors are "false positives," meaning that the test rejected the null hypothesis when it was true.[2] Type II errors are "false negatives," meaning that the test was unable to reject the null hypothesis even though it was false.[3] As explained below, when Dr. Ferrell finds that Anadarko and Cobalt have statistically significant price returns on May 3rd, 2017 (*i.e.*, test is "positive"), this finding also includes an analysis the Type I error (*i.e.*, likelihood of a "false positive").[4] This is consistent with the generally accepted event study methodology and the academic literature.[5]

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[1] Expert Rebuttal Report of Allen Ferrell, Ph.D., dated January 25, 2023, (the "Ferrell Rebuttal").

[2] *Reference Manual on Scientific Evidence, Federal Judicial Center*, 3rd Ed., (2011), at 300-301. ("A statistical test makes a Type I error when (1) the null hypothesis is true and (2) the test rejects the null hypothesis, *i.e.*, there is a false positive.").

[3] *Id.*, at 301. ("A statistical test makes a Type II error when (1) the null hypothesis is false and (2) the test fails to reject the null hypothesis, *i.e.*, there is a false negative.").

[4] Ferrell Rebuttal, ¶30.

[5] *Reference Manual*, at 250-251. ("Statistical significance is determined by comparing p to a preset value, called the significance level. The null hypothesis is rejected when p falls below this level. … The p-value is the probability of getting data as extreme as, or more extreme than, the actual data — given that the null hypothesis is true."

3. However, when Dr. Ferrell finds that ConocoPhillips price return on May 3rd, 2017, is not statistically significant (*i.e.*, test is "negative"), and claims that "[t]his means that the value of the Shenandoah news is zero for ConocoPhillips,"[6] he fails to analyze the Type II error and the likelihood of a "false negative."[7] In fact, he entirely ignores the issue whether his ConocoPhillips' event study even has the Power to detect an effect if there is an effect to detect.[8] This is a material omission because, as I will explain below, the Power of Dr. Ferrell's ConocoPhillips event study is only 33%, while the Type II error is 67%, meaning that his event study would only be expected to detect an effect 33% of the time, even if there was an effect to detect, rendering his result unreliable or "inconclusive."[9] Instead of properly reporting his statistical results, Dr. Ferrell incorrectly states that the absence of statistical significance for the ConocoPhillips price return on May 3, 2017, "means that the value of the Shenandoah news is zero for ConocoPhillips and, accordingly, the value of the Shenandoah news would also be zero for Anadarko."[10] This conclusion is inconsistent with the generally accepted interpretation of the statistical event

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6 Ferrell Rebuttal, ¶30.

7 *Id*.

8 *Reference Manual*, at 254. ("Power is the chance that a statistical test will declare an effect when there is an effect to be declared.") Mathematically, the power is one minus the probability of a Type II error.

9 *Id*. ("When a study with low power fails to show a significant effect, the results may therefore be more fairly described as inconclusive than negative.").

10 Ferrell Rebuttal, ¶30.

study results and the academic literature, and instead relies on the so-called appeal to ignorance fallacy.[11]

II. IMPORTANCE OF STATISTICAL SIGNIFICANCE AND TYPE I ERROR WHEN ANALYZING PRICE IMPACT

4. Dr. Ferrell's own event studies determined that the May 3, 2017, price declines in Anadarko and Cobalt were statistically significant. Statistical significance in this context means that the price declines in Anadarko and Cobalt's stock price cannot be explained by the market and industry indices used in Dr. Ferrell's event study, or using Dr. Ferrell's own words: "the price movement of a company's stock price on a particular day can reliably be distinguished from zero," meaning that "the price movement is due to the disclosure of new value-relevant information rather than the random movement of the company's stock."[12]

5. The statistically significant decline in Cobalt's stock price coincided with downgrades by both Citi and Bernstein that were attributed to Anadarko's suspension of appraisal activities at Shenandoah,[13] providing strong statistical evidence that the Shenandoah news was both new and material, or value relevant, thereby contradicting Dr.

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[11] https://iep.utm.edu/fallacy/#AppealtoIgnorance ("The Fallacy of Appeal to Ignorance …: Not knowing that a certain statement is true is taken to be a proof that it is false.").

[12] Ferrell Rebuttal, ¶30.

[13] May 3, 2017, *Bloomberg* article titled "Cobalt Intl Cut at Citi as Anadarko Suspends Shenandoah Work," and May 3, 2017, *Bloomberg* article titled "Cobalt Cut to Market Perform at Bernstein."

Ferrell's unsupported opinion that the "value of the Shenandoah news is zero."[14] Importantly, Dr. Ferrell's affirmative analysis of statistical significance included an assessment of the potential Type I error, or a "false positive." More specifically, the 5% benchmark used by Dr. Ferrell means that the probability of a random price return with an equal magnitude to the one observed would only be 5% or less.[15] While this does not preclude the possibility of a Type I error, or a false positive, the 5% benchmark is a common benchmark used in the academic literature to ensure that the conclusion that an effect has been detected is reasonably reliable.[16] However, a failure to meet the 5% benchmark does not necessarily mean an absence of price impact. The analysis of an absence of price impact relates to the Type II error, or the probability of failing to detect an effect when there is one, also known as a "false negative."[17]

III. IMPORTANCE OF THE POWER AND TYPE II ERROR WHEN ANALYZING THE ABSENCE OF PRICE IMPACT

6. There are many reasons why Shenandoah was more valuable to the operator Anadarko than to ConocoPhillips.[18] However, for the purposes of this report regarding Dr.

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[14] Ferrell Rebuttal, ¶30.

[15] *Reference Manual*, at 250-251. ("Statistical significance is determined by comparing p to a preset value, called the significance level. The null hypothesis is rejected when p falls below this level. … The p-value is the probability of getting data as extreme as, or more extreme than, the actual data — given that the null hypothesis is true."

[16] *Id*. ("The 5% level is the most common in social science, and an analyst who speaks of significant results without specifying the threshold probably is using this figure.).

[17] *Id.*, at 301. ("A statistical test makes a Type II error when (1) the null hypothesis is false and (2) the test fails to reject the null hypothesis, i.e., there is a false negative.").

[18] Steinholt Class Cert. Rebuttal dated February 2, 2022, ¶¶26-30; Steinholt Rebuttal dated January 25, 2023, ¶62. Among other things, the value of Shenandoah to Anadarko was greater

Ferrell's event study, I will only focus on his statistical analysis and use the undisputed factual evidence to quantify the Power and Type II error.

7. First, it is undisputed that I have estimated the impact of the Shenandoah news on Anadarko to be $1,075 million.[19] In fact, it is my opinion regarding this impact that Dr. Ferrell attempts to rebut in the Ferrell Rebuttal.

8. Second, it is undisputed that ConocoPhillips only owned a 30% working interest in the Shenandoah at the end of the Class Period, while Anadarko owned a 33% interest.[20] This difference in ownership alone means that the $1,075 million Shenandoah impact I quantified for Anadarko in the Steinholt Report would be reduced to, at most, $977 million for ConocoPhillips.[21]

9. Third, it is undisputed that according to Dr. Ferrell's own data produced in this matter, the market capitalization for ConocoPhillips on May 2, 2017, was $57,770

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because Anadarko was the operator, and more invested in deepwater drilling, and the failure at Shenandoah would reflect more poorly on it than on ConocoPhillips who had announced years earlier that it was exiting from deepwater exploration. In fact, according to Wolfe Research, the suspension of the Shenandoah "does take away from [Anadarko's] premium for exploration, which is gone, and no longer in our price target." Macquarie, another research firm, noted that Anadarko's "longer term growth is growing increasingly elusive, especially if an already discovered project like Shenandoah is not deemed economic." The greater value of the Shenandoah to Anadarko is also reflected in Anadarko's larger book value for Shenandoah, and the fact that 5 out of 15 analysts asked questions about Shenandoah on Anadarko's 1Q2017 conference call, while Shenandoah was not even mentioned once on ConocoPhillips' 1Q2017 conference call.

[19] Steinholt Report, ¶99.

[20] *Id.*, ¶22. Deposition Transcript of Dr. Ferrell, dated March 3, 2023 ("Ferrell Deposition"), at 182:14-21. ("Q: [I]f we assume for sake of this discussion that the impact on Anadarko was $1,075,000,000, the impact on ConocoPhillips would be about $975 million; correct? A: … But, yes. So the effect, you would want to adjust to reflect the 30 or the 33 percent.").

[21] *Id.*, ¶99. ($1,075 million / 33% * 30% = $977 million).

million.[22] This means that a $977 million reduction in the market capitalization would translate into a 1.69% reduction and impact on the market capitalization, and therefore also a 1.69% impact on ConocoPhillips stock price.[23]

10. Fourth, it is undisputed that in order for a price movement to be statistically significant, using Dr. Ferrell's event study and benchmark, the absolute value of the abnormal price return has to be 2.17% or greater.[24] Alternatively, if the benchmark was lowered to the 10% level, in other words a lower benchmark than that used by Dr. Ferrell, then the absolute value of the abnormal price return has to be 1.83% or greater.[25]

11. Fifth, it is undisputed that a 1.69% price impact from the Shenandoah news is less than Dr. Ferrell's 2.17% benchmark, as well as the lower 1.83% benchmark, needed for statistical significance at the 5% or 10% level. Consequently, Dr. Ferrell's event study

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[22] APC-01318034. Market capitalization, as calculated in the data provided by Dr. Ferrell, equals the stock price times the number of ConocoPhillips' shares outstanding.

[23] ($977 million / $57,770 million = 1.69%). Ferrell Deposition, at 183:15-184:7. ("Q: [I]t would all come out essentially to a 1.69 percent change in the closing price for ConocoPhillips, which would not be statistically significant; right? … A: There's a calculation that you can do, but I'm not going to agree to a calculation that I have not verified. Q: And you haven't run this calculation? A: I did a calculation for Cobalt in my *Daubert* opinion, so it would be a similar calculation. Q: But you haven't run it for ConocoPhillips? A: No. No. But again, it's simple arithmetic.").

[24] Ferrell Rebuttal, Table 1. (Abnormal Return ((0.71%) / T-statistic (0.64) * Benchmark for 5% level (1.96) = 2.174%). Ferrell Deposition, at 174:7-17. ("Q: For ConocoPhillips to meet the benchmark for statistical significance, it has to be more than 2.17 percent; is that right? A: Maybe 2.18 percent. It would basically be the standard error, the regression times your standard for statistical significance. Q: The standard error for the ConocoPhillips event study is roughly 1.11 percent? A: I don't have – I didn't memorize it. That might be right. I mean, you can easily back it out of the ratio.").

[25] Ferrell Rebuttal, Table 1. (Abnormal Return ((0.71%) / T-statistic (0.64) * Benchmark for 10% level (1.65) = 1.83%).

does not have the ability to detect the price impact of the Shenandoah news (at most 1.69%), as it is lower than the benchmark he used for statistical significance (2.17%).[26]

12. The statistical analysis of the event study's Power and Type II error also takes into account the possibility of random volatility, and that this random volatility together with the $977 million impact could result in a statistically significant price movement, even though the $977 million impact, by itself, would not be statistically significant. In this case, I calculated the Power to be 33% and the Type II error to be 67%.[27] In other words, Dr. Ferrell's event study would be expected to fail to detect the price impact of the Shenandoah news 67% of the time, *i.e.*, it is more likely than not that his ConocoPhillips event study would not detect a $977 million price impact, even if this price impact occurred.

13. For the reasons explained above, Dr. Ferrell's claim that the absence of a statistically significant price reaction in ConocoPhillips' May 3, 2017, stock price return, using his event study, "means that the value of the Shenandoah news is zero for ConocoPhillips and, accordingly, the value of the Shenandoah news would also be zero for

[26] It is also worth noting that the $1,075 million estimated Shenandoah impact on Anadarko translates into a -3.42 price decline and is large enough to be statistically significant at the much higher 1% level, using either my event study or Dr. Ferrell's. Steinholt Report, ¶99. This difference in impact between Anadarko and ConocoPhillips is mainly a result of Anadarko's larger ownership of Shenandoah and its smaller size (or market capitalization).

[27] Exhibit A. The Type II error equals one minus the Power.

Anadarko," is not true, is based on the appeal to ignorance fallacy and is not consistent with the generally accepted event study methodology and the academic literature.[28]

Executed this 16th day of March, 2023, in San Diego, California.

BJORN I. STEINHOLT, CFA

[28] Ferrell Rebuttal, ¶30. *Reference Manual*, at 254. ("When a study with low power fails to show a significant effect, the results may therefore be more fairly described as inconclusive than negative.").

EXHIBIT A

Dr. Ferrell's ConocoPhillips Event Study

Analysis of ConocoPhillips May 3, 2017 Price Return

Analysis of Statistical Significance and Estimated Shen Impact

Standard Error	1.11%	Calculated: (Abnormal Return / T-Statistic) Ferrell Rebuttal, Table 1
Dr. Ferrell's Benchmark for Statistical Significance	1.96	T-Statistic for 5% level, two-tailed Ferrell Rebuttal, Table 1
% Benchmark for Statistical Significance	2.17%	Calculated: (1.11% * 1.96)
Estimated Shen Impact on Anadarko ($M)	$1,075	Steinholt Report, ¶99
Estimated $ Shen Impact on ConocoPhillips ($M)	$977	Caculated: (APC Impact * (30% / 33%))
ConocoPhillips Market Capitalization ($M)	$57,770	Ferrell Data: APC-01318034
Estimated % Shen Impact on ConocoPhillips	1.69%	Calculated: ($977 / $57,770)

Analysis of Power and Type II Error Associated with Dr. Ferrell's ConocoPhillips Event Study

	Mean	Statistical Significance Benchmark	Difference	T-Statistic	P-value
Negative tail	-1.69%	-2.17%	0.48%	0.44	33%
Positive tail	-1.69%	2.17%	3.87%	3.48	0%

Power	**33%**	
Type II Error	**67%**	(1 - Power)

Exhibit A